

## **REMARKS AND DISCUSSION**

Upon entry of the present amendment, Claims 53-67 remain in the application, of which, Claim 53 is independent.

The above-identified Office Action has been reviewed, the references carefully considered, and the Examiner's comments carefully weighed. In view thereof, the present Amendment is submitted. It is contended that by the present amendment, all bases of rejection set forth in the Office Action have been traversed and overcome. Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

### **Amendment Presented**

Claim 53 is amended by deleting  $\text{Al}_2\text{O}_3$  as one of the possible metal oxide materials to be used as the component (ii).

Table 5 of the specification is amended to include the letter ---S--- after "Snowtex" as the type of  $\text{SiO}_2$  being used, to add the language --- with light --- in conjunction with the heading "After irradiation", and to add the language --- place --- in conjunction with the heading "After storage in dark", such that the Table 5 exactly and accurately corresponds to the Table 5 included in International Application PCT/JP98/03705 and in parent US Application 09/380,946. In the Table 5 originally filed in the present application, the above-discussed letter and language were inadvertently omitted.

Applicant respectfully submits that the above amendments are fully supported throughout the originally filed specification, International Application PCT/JP98/03705 and parent US Application 09/380,946, including Table 5 in the priority applications, and the disclosure of specific examples in which  $\text{Al}_2\text{O}_3$  is not used as the component (ii), including Sample No. 16

in Table 5. Applicant also submits that the above amendment does not introduce any new matter into the specification. Still further, applicant respectfully submits that the amendment does not raise any new issues for consideration by the Examiner.

#### Rejections Under 35 USC 102, 103

In item 2 of the Office Action, the Examiner rejected claims 53, 54, 56-58, 60, 66, and 67 under 35 USC 102(e) as anticipated by, or in the alternative, under 35 USC 103(a) as obvious in light of Komatsu et al., U.S. 5,854,708, while in item 4 of the Office Action, the Examiner rejected claims 55, 59, and 61-65 of the present application under 35 U.S.C. § 103 as unpatentable over U.S. Patent No. 5,854,708 to Komatsu et al. ("Komatsu").

The Examiner's rejections are essentially repeated from the prior Office Action dated 21 September 2007, although the rejection under 35 USC 102(e) or 103(a) is also applied to claim 67 added in the last Amendment. Additionally, at item 5 of the Office Action the Examiner presents a "Response to Arguments" in which he briefly responds to some of applicant's arguments set forth in the last Amendment. Specifically the Examiner makes the following responses:

- a) Regarding applicant's argument that Komatsu's anti-fog element includes two films or layers, contrary to the claimed invention in which the three or more components are all situated within a single surface layer such that all of the components are in close proximity to one another within the single surface layer, the Examiner finds such argument unpersuasive because applicant's specification also describes discrete layers and sols at pages 25-26;
- b) Regarding applicant's argument "that Komatsu does not disclose using a *mixture of SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub>*, nor does it disclose using any mixture of inorganic oxides for the inorganic oxide film", the Examiner finds such argument unpersuasive because both silica and alumina are layered together over the

substrate of the claim and the prior art with no intervening layers or components such that at least some contact/combination of the two would occur;

- c) Regarding applicant's argument that Komatsu's multi-layered structure teaches away from the claimed invention, and is evidence of the non-obviousness thereof, the Examiner finds such argument unpersuasive because the prior art does not teach away from the claimed multiple sol/layer invention, since the prior art does not teach that such should be specifically avoided;
- d) Regarding applicant's argument that when used for cleaning air, as claimed, applicant's single-layer structure is far superior to the laminate disclosed by Komatsu, ", the Examiner finds such argument unpersuasive because the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious; and
- e) Regarding applicant's argument that the laminated structure of Komatsu actually shields (masks) the beneficial photocatalytic material below a surface layer of silicon dioxide, whereas the claimed structure traps ambient organic material in a single exterior layer which contains photocatalytic material which is not masked by any cover layer, the Examiner finds such argument unpersuasive for the reasons discussed in a) – d).

#### Applicant's Response

Upon careful consideration of the rejections, the disclosure of the Komatsu reference, and the Examiner's Responses to the arguments presented in the last Amendment, applicant (again) respectfully traverses the rejections, and requests reconsideration and withdrawal thereof

because Komatsu neither anticipates nor makes obvious the claimed invention for those reasons explained in the Amendment dated 20 February 2008.

Without repeating all of the arguments previously explained, applicant will attempt to briefly explain basic /fundamental differences between the claimed invention and the anti-fog element of Komatsu, to explain why the Examiner's rejections and asserted arguments appear to be based on an incorrect reading of applicant's disclosure, and to address why the Examiner has not established prima facie anticipation or establish prima facie obviousness under 35 USC 102, 103 of any of the present claims.

The claimed invention is directed to a method for cleaning air. The method involves the use of a composite comprising a substrate and a single surface layer. The surface layer is hydrophilic and self-cleanable, and comprises at least three components. The three required components are: (1) a photocatalyst, (2) a component comprising a first metal oxide selected from a first Markush group, and (3) a component comprising a second metal oxide selected from a second Markush group. The above three components are all situated within the surface layer which is provided as a single surface layer, such that all of the components are in close proximity to one another within the single surface layer.

As explained in the background section of the present specification, applicant has discovered / determined that while photocatalysts are conventionally used for converting nitrous oxides (NO<sub>x</sub>) to nitric acid, etc., a problem of the conventional photocatalytic systems is that they permit NO<sub>2</sub> (an intermediate product in the photocatalytic reaction process) to escape without being fully reacted, and even where porous adsorbents such as activated carbon are used to prevent escape of the NO<sub>2</sub>, this only provides marginal improvement for the conventional photocatalytic systems. Moreover, as also explained throughout the present specification, the presently claimed invention (including the three components in close proximity in a single surface layer) greatly enhances the conversion of NO<sub>2</sub> to nitric acid, thereby solving the discussed problem of the prior art. The close proximity of the three components in the single surface layer is believed to provide superior functionality achieved with applicant's claimed

method.

Directly contrary to the claimed invention involving at least three components in a single surface layer, Komatsu's anti-fog element is comprised of two films or layers, with one provided on a surface of the other: an inner photocatalyzer film, and an outer inorganic oxide film on the photocatalyzer film. (Id.) Given this *indisputable distinction*, Komatsu does not anticipate the claimed invention under 35 USC 102(e) because his anti-fog element does not include the claimed single surface layer. Moreover, given that Komatsu's disclosed and claimed invention necessarily requires the photocatalyst and the porous inorganic oxide to be disposed in two separate / distinct layers, the claimed invention is not made obvious under 35 USC 103 by Komatsu. Based on Komatsu's actual disclosure, persons skilled in the art would find that: Komatsu *teaches away from the claimed invention*, and hence is evidence of the non-obviousness of the claimed invention; and the reference provides no motivation whatsoever for modifying his multi-layer element such that three components (i)-(iii) are provided in a single surface layer such as in the present claims, because such modification would involve violation and destruction of Komatsu's invention.

In this regard, applicant respectfully traverses that the Examiner's responses a) and c) above because they do not accurately reflect the actual disclosure of the present specification or controlling law. While the present application may describe discrete layers and sols at pages 25-26, the described sols and layers are *not disclosed as being used together in a single composite structure having multiple layers*. Rather, each of the formulated sols is disclosed as being individually used to form a single surface layer on a separate / different tile. See, for example, the plural term "tiles" which appears at lines 4 and 8 on page 26. Given the specific discussion at pages 25-26, as well as the overall discussion of the invention throughout the present specification as *specifically involving a single surface layer*, it is inaccurate and unreasonable to interpret applicant's disclosure as encompassing a multilayer structure.

Regarding the Examiner's response c) above, applicant respectfully traverses the same because it is not a reasonable or accurate application of the law. The fact that Komatsu requires

a multi-layer structure for his anti-fog element, persons of ordinary skill in the art would recognize that this is a teaching away from the presently claimed invention in which the components (i) – (iii) are disposed in a single surface layer. It is not a legal requirement that Komatsu expressly state that his element cannot involve a single layer structure in order to teach away from the claimed invention. Persons skilled in the art would implicitly understand that the required multi-layer structure precludes a single layer structure.

Regarding the Examiner's response b) above, applicant respectfully traverses the same, again, because Komatsu does not disclose using a *mixture of SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub>*, nor does he disclose using any mixture of inorganic oxides for the inorganic oxide film. He simply discloses use of these two compositions in the alternative. Moreover, he certainly never discloses including the inorganic oxide material in the same (single) surface layer as his photocatalyst.

Regarding the Examiner's response d) above, as well as his assertion regarding his "reason to believe" in inherent characteristics of the prior art as a basis for burden shifting pursuant to *In re Fitzgerald*, 205 USPQ 294 (CCPA 1980), applicant respectfully traverses the same because the Examiner's position is *not objectively reasonable* given the facts of the present matter, which are not at all like the facts in *In re Fitzgerald*. Here, the Examiner is asserting an incorrect / mistaken interpretation of applicant's disclosure, i.e., applicant does not disclose a multi-layer structure as the Examiner is asserting or implying. Moreover, from an objective point of view, there is a very significant structural distinction between the claimed invention involving a single surface layer with at least the three components (i) – (iii) and Komatsu's anti-fog element in which an inorganic film/layer is deposited over a photocatalytic layer in a multi-layer structure. This is especially so given the importance of the claimed feature in solving a problem of the prior art as discussed throughout the present specification.

Quite differently, in *In re Fitzgerald* the claimed fastener and the prior art fastener were either identical or only slightly different (both possessed the same utility, both employed the same crystallizable polymer nylon 11, and both had an adherent patch formed by melting and then cooling the polymer), and the court found the PTO's position to be objectively reasonable

given the indisputable similarity of the claimed invention and the prior art. Here the claimed and prior art structures *are indisputably different as an objective matter*, i.e., single layer v. multiple layers. Correspondingly, there is no objectively reasonable basis for the Examiner to believe that Komatsu's multi-layer structure inherently function the same as the claimed invention, unlike the situation in *In re Fitzgerald*. Correspondingly, the Examiner cannot properly shift the burden of proof on this point.

Although it is applicant's position that the Examiner has not established prima facie anticipation or prima facie obviousness of any of the present claims under 35 USC 102, 103 for the reasons discussed above and in the previous Amendment, in an effort to expedite prosecution, claims 53 is amended above to delete reference to  $\text{Al}_2\text{O}_3$ . Komatsu never discloses or even remotely suggests use of a mixture of  $\text{SiO}_2$  and one of the other components listed in (ii), as now set forth in claim 53.

## **Conclusion**

Applicant respectfully suggests that as presently amended, all of the pending claims are believed to be allowable. It is applicant's contention that no possible reading of the references of record, either singly or in any reasonable combination, can be viewed as teaching applicant's claimed invention.

For all of the above mentioned reasons, applicant requests reconsideration and withdrawal of the rejection of record, and allowance of the pending claims.

Applicant respectfully submits that all of the above amendments are fully supported by the original application. Applicant also respectfully submits that the above amendments do not introduce any new matter into the application.

Entry of the present Amendment is respectfully requested under 37 CFR 1.116 on the grounds that: the Amendment does not raise any new issues for consideration by the Examiner; the Amendment simplifies issues of appeal (if necessary); the amendment to Table 5 makes the disclosure consistent with the priority applications; and moreover, the Amendment is believed to place the application in condition for allowance.

Favorable reconsideration is respectfully requested.

Respectfully submitted,



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